We can thus trace our rows of Cœlenterate buds along a line of development, each step in which, so far as I can see, would be a necessary result of their locomotory activities, not as so many separate buds, but acting together as a single complex organism. This line has led us, without strain or difficulty, to the typical Annelid with its cœlomic cavities and its parapodia.

On page 2 I stated that I considered the metameric segmentation so remarkable a phenomenon that wherever traces of it can be discovered we are justified in assuming descent from Annelidan ancestors. The segmentation found so widely spread in the vegetable kingdom is a parallel phenomenon, being due to periodical buddings. In the Vertebrata we have organisms which show very distinct traces of segmentation, but complicated by the fact that their most characteristic structure, the notochord, shows no traces of having been primitively segmented. The jointing which later appears in the vertebral column has apparently been impressed upon it as a mechanical necessity by the segmented organism in which it developed. For an attempt to show how the vertebrate organization with its primitively unsegmented notochord can be deduced along what appears to be a similarly straightforward line of mechanical adaptations from an annulate ancestor, see "A new Reading in the Annulate Ancestry of the Vertebrata," Natural Science, vol. xiii. 1898, p. 17.

[NOTE.—This paper was written eighteen months ago, and was finally corrected for press before the appearance of Prof. Lankester's critical *résumé* of the subject in the recent instalment of his 'Text-book of Zoology.']

LXIX.—*On some little-known African Silurid Fishes of the Subfamily* Doradinæ. By G. A. BOULENGER, F.R.S.

AMONG the least-known freshwater fishes of Africa there is a group of small or very small Silurids, more or less closely allied to *Synodontis* and falling under Günther's division "*Stenobranchiæ*," which have been described in a more or less satisfactory manner by various authors under the generic names of *Mochocus*, *Rhinoglanis*, *Chiloglanis*, *Doumea*, *Atopochilus*, and *Peltura*. Having lately had the privilege of examining the few specimens of these fishes preserved in the

Paris, Hamburg, and Genoa Museums, and having received examples of new or rare species from the Nile and Congo, I have attempted to meet a long-felt requirement by drawing up original comparative descriptions of all the genera and species.

- Chiloglanis *Ptrs.*
  - Deckenii, *Ptrs.*
  - niloticus, *Blgr.*
- Euchilichthys, *Blgr.*
  - Guentheri, *Schilth.*
  - Dybowskii, *Vaill.*
- Atopochilus, *Sauv.*
  - Savorgnani, *Sauv.*
- Mochocus, *Joannis.*
  - niloticus, *Joannis.*
- Doumea, *Sauv.*
  - typica, *Sauv.*
- Phractura, *Blgr.*
  - Bovei, *Perugia.*
  - scaphirhynchura, *Vaill.*
- Andersonia, *Blgr.*
  - leptura, *Blgr.*

1. CHILOGLANIS.

Chiloglanis, Peters, Mon. Berl. Ak. 1868, p. 599.

Body moderately elongate, feebly depressed. Anterior dorsal entirely in advance of ventrals, formed of 1 spine and 5 branched rays; an adipose fin opposed to the anal; pectoral with a spine; ventral with 7 rays. A cephalo-nuchal bony shield. Mouth inferior, surrounded by a very large, circular, papillose lip; conical teeth on the præmaxillaries and on the vomer *; movable, slender, curved teeth in the mandible; a maxillary and two mandibular barbels on each side; nostrils rather remote from each other, both with a valve, the anterior tubular; eyes small, without free border. Gill-clefts short, confined to the sides. Air-bladder small, partially enclosed on each side between the enlarged processes of the anterior vertebræ.

1. *Chiloglanis Deckenii.*

Chiloglanis Deckenii, Peters, Mon. Berl. Ak. 1868, p. 599, pl. ii.; Pfeffer, Fische O. Afr. p. 38, fig. (1896).

Synodontis eurystomus, Pfeffer, Jahrb. Hamb. Wiss. Anst. vi. 1889, p. 14, and x. 1893, p. 31, pl. i. fig. 5.

Body slightly depressed, its depth 5½ to 6⅓ times in total length. Head strongly depressed, a little longer than broad, its length 3 to 3½ times in total length. Eye directed upwards, in the second half of the head, its diameter about 5 times in length of head and 1½ in interorbital width, which equals the distance between the eye and the nostril; two widely separated oval groups of præmaxillary teeth, forming 3 or 4 transverse series; a series of 6 to 8 short mandibular teeth; maxillary barbel about $\frac{1}{3}$ length of head, a little longer than the lower labials. Dorsal I 5; spine not distinctly serrated, about $\frac{2}{3}$ length of head. Adipose fin $\frac{1}{3}$ to $\frac{1}{2}$ its distance from the rayed dorsal. Anal III 6. Pectoral spine a little longer than the dorsal. Ventral extending to beyond origin of anal. Caudal forked. Caudal peduncle nearly twice as long as deep. Olive-brown, with irregular darker cross-bands; a dark bar at the base of the caudal and another across each lobe of the fin.

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* "Præmaxillary teeth" of Peters.

Total length 70 millim.

German East Africa (Korogwe, on the Rufu River).

Type in Berlin Museum.

Thanks to the kindness of Prof. Pfeffer, one of the specimens obtained by Stuhlmann at Korogwe is now in the British Museum.

2. *Chiloglanis niloticus*, sp. n.

Distinguished from *C. Deckenii* in the following characters:—

Depth of body 4 to $4\frac{1}{2}$ times in total length. Diameter of eye 6 times in length of head; interorbital width much greater than the distance between the eye and the nostril. Dorsal I 6, the spine about $\frac{2}{5}$ length of head. Pectoral spine $\frac{3}{5}$ length of head. Anal III 8. Pale greyish olive above, yellowish beneath; four broad blackish cross-bands on the body; a horizontal blackish bar on each lobe of the caudal.

Total length 45 millim.

Several specimens were obtained in May last by Mr. W. L. S. Loat whilst on the island of Arko, Soudan.

2. EUCHILICHTHYS, gen. nov.

Body moderately elongate, not or but feebly compressed. Anterior dorsal entirely in advance of ventrals, formed of 1 spine and 6 branched rays; an adipose fin opposed to the anal; pectoral with a spine; ventral with 7 rays. A cephalo-nuchal bony shield. Mouth large, inferior, surrounded by a much-developed, circular, papillose lip; a broad band of pointed, curved, movable teeth in the præmaxillaries, this band entirely in advance of the narrower band of mandibular teeth, the base of which is long and slender, the crown truncate or notched and bent up hook-like; conical teeth on the vomer; a barbel on each side, and a pair of very short ones on each side of the lower section of the circular lip; nostrils rather close together, the posterior with a valve; eyes with free border. Gill-clefts short, confined to the sides. Air-bladder small, partially enclosed on each side between the enlarged processes of the anterior vertebræ.

Distinguished from *Chiloglanis* by the angularly bent, truncate or bicuspid mandibular teeth, which form a broad band; from *Atopochilus* by the pointed præmaxillary teeth so different from those on the mandible.

Two species.

1. *Euchilichthys Guentheri.*

Atopochilus Guentheri, Schilthuis, Tijdschr. Nederl. Dierk. Ver. (2) iii. 1891, p. 86, pl. vi. fig. 2.

Depth of body ⅔ its greatest width, 7 times in total length. Head large, much depressed, covered with soft skin, a little longer than broad, its length 3½ times in total length; snout broadly rounded, nearly twice as long as postocular part of head; nostrils nearer end of snout than eye, the diameter of which is 5 times in interocular width; buccal cleft straight, nearly half length of head; lateral barbel ¼ length of head, posterior barbels about half diameter of eye. D. I 6, originating immediately behind pectorals; spine strong, covered with skin, measuring ¼ length of head. Adipose fin very short. A. 10 (3 rays rudimentary). Pectoral spine ½ length of head, its inner border with strong retrorse spines. Ventrals not reaching anal. Caudal forked. Caudal peduncle 1½ as long as deep. Skin villose. Dark brown, with small round black spots on the anterior parts.

Total length 190 millim.

The single known specimen, from the Stanley Pool, Congo, is now in the British Museum.

2. *Euchilichthys Dybowskii.*

Chiloglanis Dybowskii, Vaillant, Bull. Soc. Philom. 1892, no. 16, p. 2.

Body a little deeper than broad, its depth 4½ times in total length. Head large, moderately depressed, covered with a very thin skin, not quite 1½ as long as broad, its length 2⅔ times in total length; snout rounded, nearly twice as long as postocular part of head; nostrils nearer end of snout than eye, the diameter of which is 5 to 5½ times in length of head, twice in interocular width; buccal cleft straight, ⅖ length of head; lateral barbel nearly ¼ length of head, posterior shorter still. D. I 6; spine strong and smooth, ⅖ length of head.

Adipose fin much longer than deep, nearly as long as its distance from the first dorsal. A. 10 (3 rays rudimentary). Pectoral spine $\frac{3}{5}$ length of head, its inner border with 4 or 5 strong retrorse spines. Ventrals extending a little beyond origin of anal. Caudal deeply emarginate. Caudal peduncle as long as deep. Skin villose on the sides of the body. Pale brown; a blackish band across the dorsal, another across the pectorals; ventrals and anal blackish.

Total length 39 millim.

The two type specimens, from the Ubanghi, French Congo, are preserved in the Paris Museum.

3. ATOPOCHILUS.

Atopochilus, Sauvage, Bull. Soc. Philom. (7) iii. 1878, p. 96, and N. Arch. Mus. (2) iii. 1880, p. 42.

Body moderately elongate, feebly depressed. Anterior dorsal entirely in advance of ventrals, formed of 1 spine and 6 branched rays; an adipose fin opposed to the anal, which is short; pectoral with a strong spine; ventral with 7 rays. A cephalo-nuchal bony shield. Mouth large, inferior, surrounded by a much developed, circular, papillose lip; teeth fine, slender, movable, truncate, bent at an obtuse angle and forming a very broad band in the præmaxillaries, this band entirely in advance of the narrower band of mandibular teeth, which are similar to the præmaxillaries, but closer together; conical teeth on the vomer; a barbel on each side, and another pair on the posterior border of the lip; nostrils close together, the posterior with a valve; eyes with free border. Gill-clefts short, confined to the sides.

A single species.

1. *Atopochilus Savorgnani.*

Atopochilus Savorgnani, Sauvage, *ll. cc.* pl. iii. fig. 3.

Depth of body a little less than its greatest width, $5\frac{2}{3}$ times in total length. Head depressed, $1\frac{1}{2}$ as long as deep, a little longer than broad, its length $3\frac{3}{5}$ times in total length; upper surface of head a little rugose; snout broadly rounded, its length $2\frac{1}{2}$ postocular part of head; nostrils nearer end of snout than eye, the diameter of which is $4\frac{1}{2}$ times in length of head, $1\frac{2}{3}$ in interorbital width; buccal cleft straight, $\frac{3}{5}$ length of head; band of mandibular teeth not half as broad as that of præmaxillaries; lateral barbel $\frac{1}{4}$ length of head, more than twice as long as posterior barbel. Occipito-nuchal shield as long as broad, ending in two points. A striated, acutely pointed humeral process. D. I 6; spine striated, $\frac{2}{3}$ length of head. Adipose fin 3 times as long as deep, $\frac{2}{3}$ its distance from rayed dorsal. A. 11 (2 rays rudimentary). Pectoral with a strong striated spine bearing 12 retrorse teeth on its inner border, its length $\frac{3}{4}$ that of head. Ventral nearly reaching origin of anal. Caudal peduncle $1\frac{1}{2}$ as long as deep*.

Total length 90 millim.

The single specimen, preserved in the Paris Museum, is from the falls of Doumé, Upper Ogowe.

4. MOCHOCUS.

Mochokus, Joannis, Mag. Zool. 1835, Poiss.; Günth. Cat. Fish. v. p. 217 (1864).
Rhinoglanis, Günth. *t. c.* p. 216.

Body moderately elongate, slightly compressed. Anterior dorsal ending over the ventrals, formed of a strong spine and 7 or 8 branched rays; a second dorsal, formed of soft rays, above the short anal; pectoral with a strong spine; ventral with 7 rays. A cephalo-nuchal bony shield. Mouth subinferior, without labial folds; small conical teeth in both jaws; a maxillary and two mandibular barbels on each side; nostrils rather remote from each other, both with a valve, the posterior very large; eyes moderate, without free border. Gill-clefts short, confined to the sides. Air-bladder large, free.

1. *Mochocus niloticus.*

Mochokus niloticus, Joannis, *l. c.* pl. viii.
Rhinoglanis typus, Günth. *l. c.* p. 216, fig., and in Petherick's Trav. ii. p. 237 (1869).
Rhinoglanis Vannutellii, Vinciguerra, Ann. Mus. Genova, (2) xix. 1898, p. 254.

Depth of body $5\frac{1}{3}$ to $5\frac{2}{3}$ times in total length, length of head 4 to $4\frac{1}{3}$. Head depressed, as long as broad, rugose above; a large frontal fontanelle; eye directed upwards, 3 to $3\frac{1}{2}$ times in length of head, not much narrower than interorbital width; barbels long and slender, the maxillary reaching end of pectoral spine or beyond. Anterior dorsal I 7–8; spine nearly as long as head, with ascending serræ on anterior border; second dorsal 10–15, about as long as its distance from the first. Anal 9–10. Pectoral spine a little longer than dorsal, serrated like it on outer border, with very strong retrorse teeth on inner border. A long, sharp, humeral process. Ventral not reaching anal. Caudal forked. Caudal peduncle nearly twice as long as deep. Pale greyish olive above, speckled and marbled with blackish; two more or less distinct, irregular, dark bands across the back, one under each of the dorsal fins; belly white; dorsals and caudal with blackish dots.

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* The caudal fin is injured in the type specimen; it was probably notched or forked, not truncate, as figured by Sauvage.

Total length 55 millim.

The type specimen is not to be found in the Paris Museum.

The figures given by Joannis are very incorrect, as may be inferred from the discrepancies between them. A comparison of specimens obtained by Mr. Loat at Assuan with the type of *Rhinoglanis typus,* from Gondokoro, and those of *R. Vannutellii,* from Lake Rudolf, has convinced me that these supposed species cannot be maintained as distinct from *Mochocus niloticus.*

5. Doumea.

Doumea, Sauvage, Bull. Soc. Philom. (7) iii. 1878, p. 96, and N. Arch. du Mus. (2) iii. 1880, p. 41.

Body elongate, depressed, with extremely slender caudal peduncle. Two short dorsal fins, the anterior entirely in advance of the ventrals and formed of one simple, flexible, and 6 branched rays, the second opposed to the anal and formed of fine soft rays partly concealed in adipose tissue; pectoral and ventral fins large, horizontally expanded, without spine, but with thickened, simple outer ray; 12 rays to the pectoral, 6 to the ventral. No cephalo-nuchal shield. Mouth small, inferior, surrounded with large papillose lips; no mandibular teeth; small conical præmaxillary teeth *; a maxillary and two mandibular barbels on each side; nostrils rather remote from each other, both with a valve; eyes small, without free border. Gill-clefts narrowly interrupted at the isthmus.

A single species.

Sauvage referred this genus to the "*Pimelodinæ*" of Günther. Vaillant (Bull. Mus. Paris, 1897, p. 82), on the contrary, referred it to the vicinity of *Synodontis,* a view in which I entirely concur.

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* The "vomerine" teeth of Sauvage.

1. *Doumea typica.*

Doumea typica, Sauv. *ll. cc.* pl. iii. fig. 1.

Depth of body slightly less than its width, 8 times in total length. Head strongly depressed, with slightly rugose skull covered with a thin skin, 1½ as long as broad, 5⅓ times in total length; snout pointed, projecting a little beyond the mouth, 1¾ as long as postorbital part of head; internarial space equally distant from end of snout and eye; latter directed upwards, its diameter 6½ times in length of head, 1½ in interorbital width; maxillary barbel ⅓ length of head, mandibular barbels shorter still. Occipital process narrow, 3 times as long as broad, not reaching interneural shield. Dorsal I 6, first ray a little longer than the head. Anal I 7. Pectorals reaching the ventrals, which extend far beyond origin of anal. Caudal with crescentic notch. Caudal peduncle a little depressed, ⅓ total length. Uniform brownish in spirit.

Total length 90 millim.

The unique specimen in the Paris Museum is from the falls of Doumé, Upper Ogowe.

6. PHRACTURA, n. n.

Peltura (non M.-Edwards), Perugia, Ann. Mus. Genova, (2) x. 1892, p. 972.

Body elongate, depressed, with extremely slender caudal peduncle; a series of imbricate scutes along each side of the back and belly from the dorsal and ventral fins to the caudal peduncle, which is entirely surrounded by bony scutes. Two short dorsal fins, the anterior entirely in advance of the ventrals and formed of one simple, flexible, and 6 or 7 branched rays, the second opposed to the anal and formed of fine soft rays; pectoral and ventral fins large, horizontally expanded, without spine, but with thickened, simple outer ray; 10 rays to the pectoral, 6 to the ventral. No cephalonuchal shield. Mouth small, inferior, surrounded with large papillose lips; no mandibular teeth; small conical præmaxillary teeth; a maxillary and two mandibular barbels on each side; nostrils rather remote from each other, both with a valve; eyes small, without free border. Gill-clefts narrowly interrupted at the isthmus.

Two species.

1. *Phractura Bovei.*

Peltura Bovei, Perugia, *l. c.* fig.

Depth of body 9 times in total length, length of head 6 times. Head $1\frac{1}{3}$ as long as broad; skull a little rugose, covered with thin skin; snout a little longer than the postocular region of the head, pointed, projecting beyond the mouth; the space between the nostrils equally distant from the end of the snout and the eye, which is directed upwards; the diameter of the eye 10 times in the length of the head and $2\frac{1}{2}$ in the interocular width; maxillary barbels $\frac{2}{3}$ length of head, nearly reaching the gill-cleft, mandibular barbels much shorter. Occipital process 3 times as long as broad, not reaching interneural shield. Dorsal I 7; first ray longest, $\frac{1}{4}$ longer than the head; second dorsal very small. Anal I 7. Pectoral a little longer than the head, as long as the ventral; latter nearly reaching the anal. Caudal with crescentic notch. Caudal peduncle depressed, $\frac{1}{3}$ total length. 23 dorsal and 19 ventral scutes, the last 5 on the caudal peduncle. Uniform yellowish in spirit.

Total length 110 millim.

Lower Congo. Type in Genoa Civic Museum.

2. *Phractura scaphirhynchura.*

Doumea scaphirhynchura, Vaillant, Rev. Scientif. xxiii. ii. 1886, p. 18.
Peltura scaphirhynchura, Pellegrin, Bull. Mus. Paris, 1900, p. 6.

Differs in the following points from the preceding species:—Length of head 5 times in total length, $1\frac{1}{2}$ its width; snout twice as long as postocular part of head; diameter of eye 7 times in length of head, $1\frac{1}{2}$ in interocular width; maxillary barbel $\frac{1}{4}$ length of head, $\frac{1}{3}$ the distance separating its root from the gill-cleft. Occipital process $2\frac{1}{2}$ as long as broad, reaching interneural shield. Dorsal I 6, first ray as long as head. Pectoral not longer than head. 22 dorsal and 18 ventral scutes.

Total length 120 millim.

Diélé, on Alima R., French Congo. Type in Paris Museum.

7. ANDERSONIA, gen. nov.

Body elongate, depressed, with extremely slender caudal peduncle; a series of imbricate scales along each side of the back and belly from the dorsal and ventral fins to the caudal peduncle, which is entirely surrounded by bony scutes. Two short dorsal fins, the anterior above the ventrals and formed of one simple ossified ray or spine and 6 branched rays, the second opposed to the anal and formed of fine soft rays preceded by a short spine; pectoral and ventral fins moderately large, the former with a spine; 8 rays to the pectoral, 6 to the ventral. No cephalo-nuchal shield. Mouth small, inferior, toothless; lips not much developed; a maxillary and a mandibular barbel on each side; nostrils remote from each other, both with a valve; eyes small, without free border. Gill-clefts narrowly interrupted at the isthmus.

Nearest allied to *Phractura*, from which it is well distinguished by the position of the anterior dorsal, the presence of a spine in front of each of the dorsals, the presence of a single mandibular barbel, and the total absence of teeth.

Named in memory of the late Dr. John Anderson, to whose exertions during the latter years of his life Science is indebted for much progress in the zoology of the Nile region, and to whose initiative we owe the organization of a survey of the Nile Fishes which is now being carried on by the Egyptian Government.

1. *Andersonia leptura*, sp. n.

Depth of body 9 times in total length, length of head 5 times. Head $1\frac{1}{2}$ as long as broad; skull rugose; snout as long as the postocular part of the head, thrice as long as the diameter of the eye, which is half the interorbital width; barbels slender, as long as the snout. Occipital process keeled, $2\frac{1}{2}$ as long as broad, widely separated from the interneural shield; a shorter process on each side of the occipital process. Anterior dorsal I 6; first ray longest, nearly as long as the head. Anal I 9. Pectoral $\frac{2}{3}$ length of head, as long as the ventral, widely separated from the anal. Caudal with crescentic notch. Caudal peduncle depressed, $\frac{1}{3}$ total length. 25 dorsal and 23 ventral scutes, the last 9 on the caudal peduncle. Greyish above, marbled with blackish, white beneath.

Total length 50 millim.

A single specimen was found by Mr. Loat in a pond near Koshek, Soudan, in March 1900.